

II. HISTORICAL DATA

A. Historical Development & Early Uses

The Abenaki Indians lived in a large settlement on the peninsula between the Winnepesaukee and Pemigewasset rivers where they join to form the Merrimack River. Indian activities included hunting, fishing and trapping. This area provided abundant fishing grounds and good hunting. The Indians used the still-standing stone mortar at the top of Willow Hill, now known as Clark farm, to grind corn. The Indians often used Webster Lake as a storage facility for canoes (Shepard).

The small trading and fishing villages of the Merrimack Valley gradually grew into agricultural towns that were often named by the first settlers for the homes they had left in England or along the New England seacoast (Shepard).

In 1825, two prominent settlers, Ebenezer Eastman and Captain Ebenezer Blanchard filed a petition with the New Hampshire Legislature to form the town of Franklin. This new town was comprised of sections from 4 older towns: Sanbornton, Northfield, Salisbury, and Andover (West Franklin). Webster Lake and its outlet were a part of this new town. After a dispute between the four towns, Franklin was finally incorporated on December 24, 1828.

Ebenezer Eastman, Captain Ebenezer Blanchard and their associates were drawn to the area because of its many rivers and brooks. They constructed grist mills and saw mills along the river to take advantage of the abundant water power. One of Franklin's most noted early settlers was the Clark family. The Clark farm still stands at the corner of Clark and Central Streets. The city's famous native, Daniel Webster, spent time each summer at his farm in the lower village. In 1851, he made a speech near Aiken Park in appreciation of Webster Lake, previously known up until this point as Great Pond or Clough's Pond. His words included, "Much has been written and said of the beauties of Lake Como in Italy, but that sheet of water is no more beautiful than the one on whose shores I now stand."

The late 1700's and early 1800's ushered in a boom of manufacturing interests due to the abundance of water power. Factories were constructed, churches were built and town meetings were held.

The railroad first passed through Franklin during the 1840's and this stimulated increased business activity. The period following 1840 was an era of great inventions with a corresponding growth in the importance of manufacturing (Shepard). In 1894, Franklin was officially declared a city. In November of that same year the first mayor and city council were elected.

Even after many years of booming growth, Franklin was still vulnerable to Mother Nature. A flood in 1936 left destruction up and down the banks of the Winnepesaukee and Merrimack rivers. Homes and businesses were destroyed. With the memory of the flood still fresh in people's memory, the 1938 hurricane brought more destruction and hardship.

The City of Franklin survived and now represents one of the two urban centers located in the Lakes Region of New Hampshire (Dufresne-Henry, and WS&PCC 1981).

B. Uses & Access Points

Webster Lake and the surrounding area are considered to be of moderate in recreational value. Webster Lake offers cabin rentals, an inn and two public beaches. Griffin Beach is located on the eastern side while Legace Beach is located just west of the outlet. A public boat launch is situated at Legace Beach. Fishing is popular during both the summer and winter months with perch, trout and bass being popular catches. Also enjoyed are boating, swimming, and water skiing during the warmer months and snowmobiling, cross country skiing and walking during the colder months. A winter carnival, sponsored by the Recreation Department, is an annual lake event.

C. Historical Water Quality

1. Water Quality Surveys

A 1938 water quality survey conducted by New Hampshire Fish & Game characterized Webster Lake as a natural pond with light brown colored water and a maximum depth of 12.2 meters (40 feet). Emergent vegetation was described as scant and submerged vegetation as common. The transparency was recorded as 3.81 meters (12.5 feet). Hypolimnetic anoxia was a problem even in 1938 as only 0.4 ppm was measured at the time of sampling.

A limnological survey conducted by the Department of Environmental Services on July 5, 1979 recorded a transparency of 3.0 meters and a chlorophyll-a of 3.99 mg/m³. Vegetation was described as sparse but a comment noted abundant vascular plants at the Sucker Brook inlet. The hypolimnion had only 5% dissolved oxygen (D.O.) saturation with 0.5 mg/L of oxygen at a depth of 10.5 meters. The mid-hypolimnetic total phosphorus value measured 15 ug/L. Utilizing the 1979 survey results and the State of New Hampshire Classification Scheme, Webster Lake was classified as mesotrophic (Towne and Estabrook, 1981).

The 1981 Water Quality Management Investigation of Webster Lake (Dufresne-Henry, and NHWS&PCC, 1981) concluded the following about lake conditions for the study year:

1. No unusually high levels of fecal coliform bacteria or nutrients were measured for prolonged periods during the study period.

2. The nitrogen to phosphorus (N:P) ratios calculated for Webster Lake clearly confirm that phosphorus is the limiting nutrient for algal production, based on total phosphorus and total Kjeldahl nitrogen.

3. The trophic classification of Webster Lake was confirmed as mesotrophic which indicates that the lake contains moderate nutrients and algal production.

4. A lack of hypolimnetic oxygen (anoxia) does not develop in Webster Lake until mid July and exists for less than two months. It is assumed that phosphorus transport is occurring across the sediment/water interface due to the high phosphorus concentration in the lake sediments. On this basis, the time span that phosphorus in the sediments could be available to the overlying water is relatively short and it was concluded that internal phosphorus loading was not significant.

2. Complaints & Aquatic Nuisances

The shoreline of Webster Lake has been treated several times over the years with copper sulfate in attempts to improve the poor aesthetic conditions caused by filamentous green algae. Mougeotia, Spirogyra and Zygnema have all been documented in the complaints. Applications of copper sulfate were made in 1975 through 1978. The applications were limited to shoreline areas and the amount of copper sulfate applied ranged from 200-1400 lbs. Copper Sulfate treatments were discontinued after 1978.

3. Volunteer Lake Assessment Program

In 1985, the Department of Environmental Services (DES) began the New Hampshire Volunteer Lake Assessment Program (NHVLAP). The program is a unique partnership between DES and volunteer monitors. The three main objectives of NHVLAP include the collection of water quality data to develop an extensive baseline database, the analysis and interpretation of trend information, and the identification of current and potential water quality problems.

Volunteers are trained in sampling procedures, field analysis, and interpretation of data. They are also directed to identify possible point and non-point sources of pollution.

The Webster Lake Association joined NHVLAP in September 1986. From 1987 to 1990 the volunteers have collected samples once a month from June through September, except for 1988 when volunteers also sampled in May. The following is a discussion of the data collected by volunteers and a biologist who visited the lake once during each sampling season. Generally, the lake experienced the highest chlorophyll-a concentration during the month of July for each sampling year. Figure II-1, NHVLAP data, shows the relationship between mean transparency values and mean chlorophyll-a concentrations.

The mean transparency values ranged from 4.0 meters in 1990 to 4.8 meters in 1988. The greatest transparency value was 5.6 meters in August of 1987 while the lowest value of 3.0 meters was recorded in September of 1990.

Hypolimnetic and epilimnetic total phosphorus concentrations are shown in Figure II-2. The mean concentration of epilimnetic phosphorus ranged from 11.0 ug/L in 1988 to a maximum of 17.0 ug/L in 1986. The mean hypolimnetic phosphorus concentration ranged from 24 ug/L in 1988 to 93.5 ug/L in 1990. The highest hypolimnetic phosphorus concentration of 183 ug/L was recorded in September 1990, while the lowest recorded hypolimnetic phosphorus sample (47 ug/L) was observed in July 1988.

Dissolved oxygen/temperature profiles were collected once a year. During the summer months, the lake experiences thermal stratification and anoxia occurs within the hypolimnion (Figure II-3).

Phytoplankton samples were collected on an annual basis by VLAP. The dominant plankton identified was either diatoms or golden-browns. Relatively low abundances of blue-greens were observed.

Other parameters measured by VLAP includes color, conductivity, pH and ANC. The data is not discussed in detail because it was determined that these parameters were not significant contributors to the degradation of Webster Lake. Appendix II presents VLAP data.

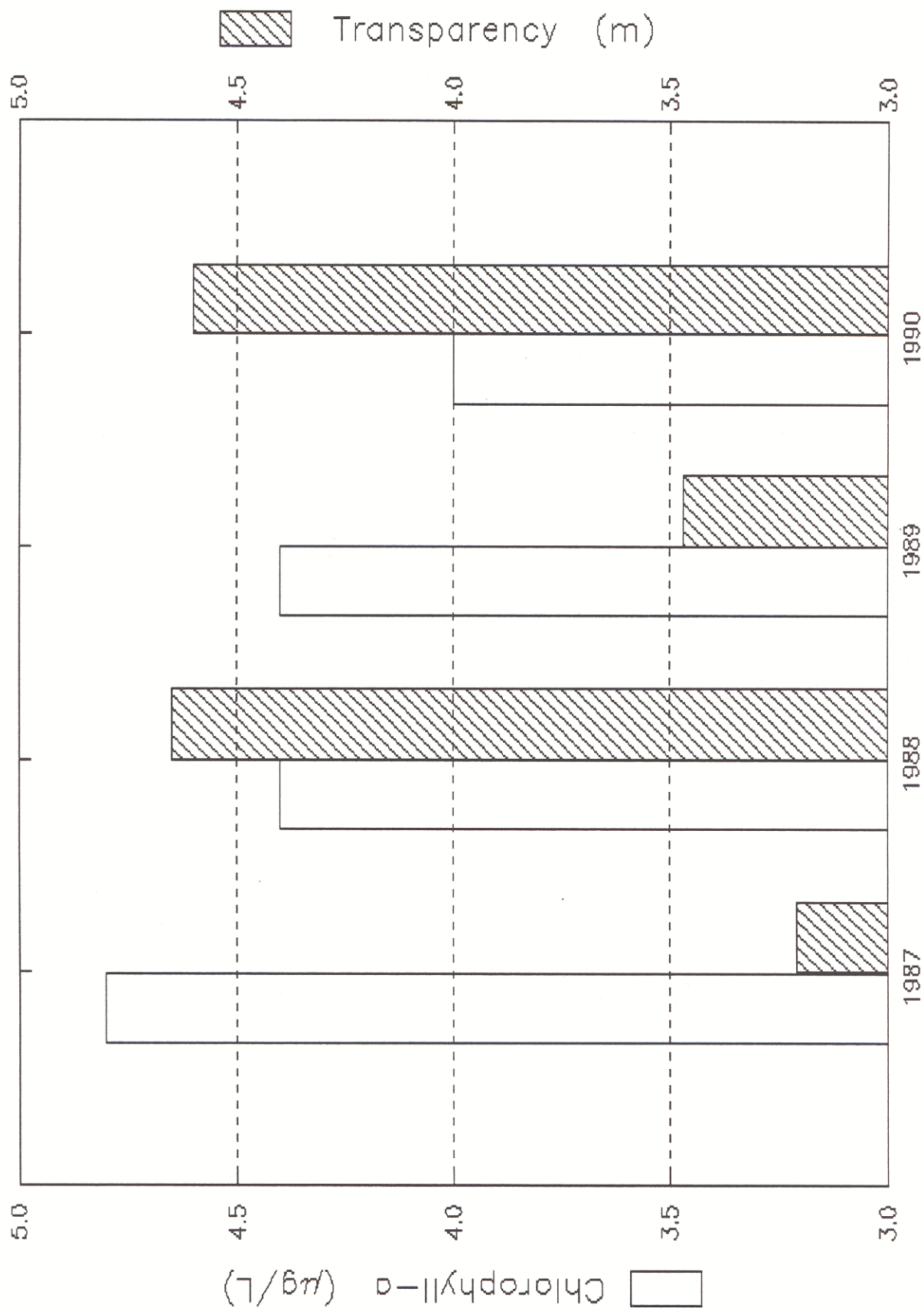


Figure II-1. Chlorophyll-a and Secchi Disk Transparency data collected by the Volunteer Lake Assessment Program.

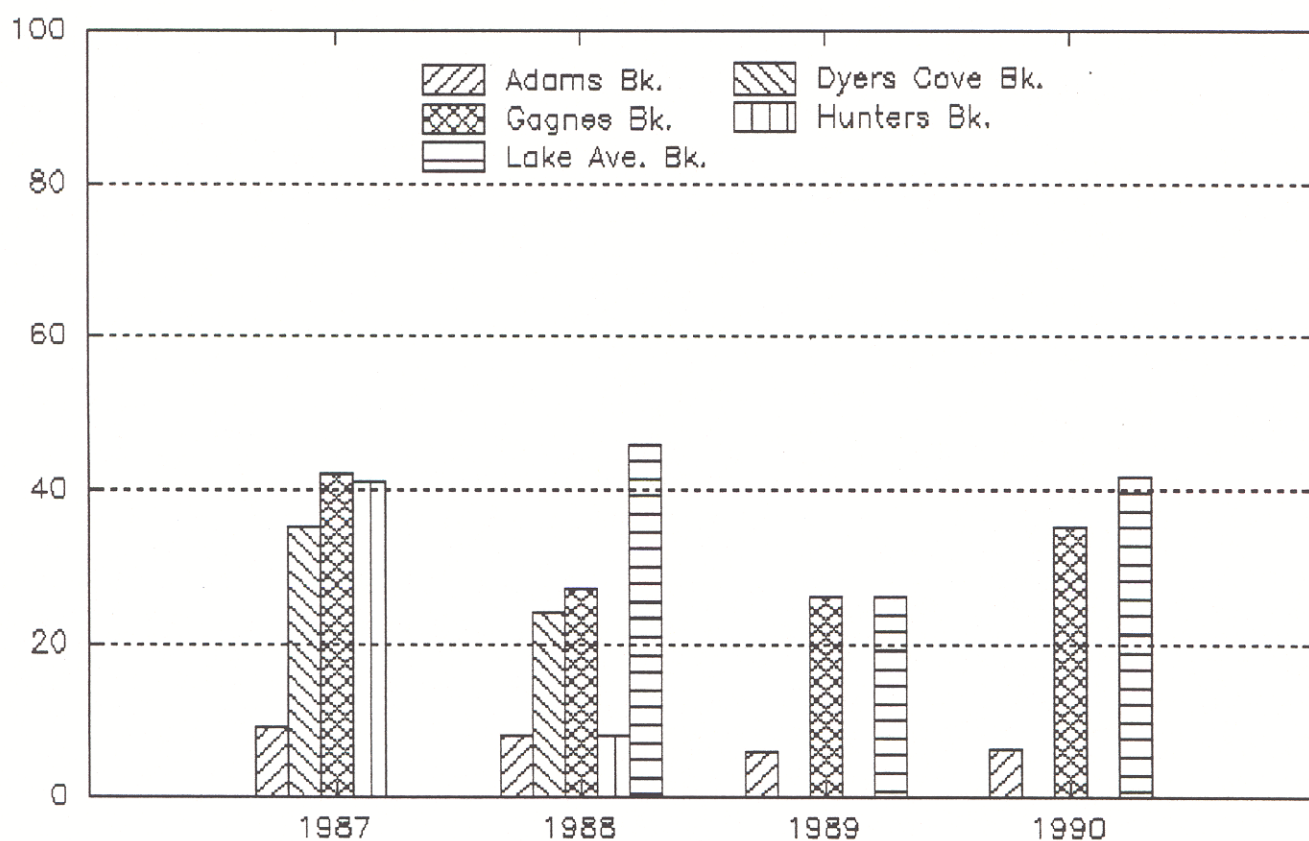
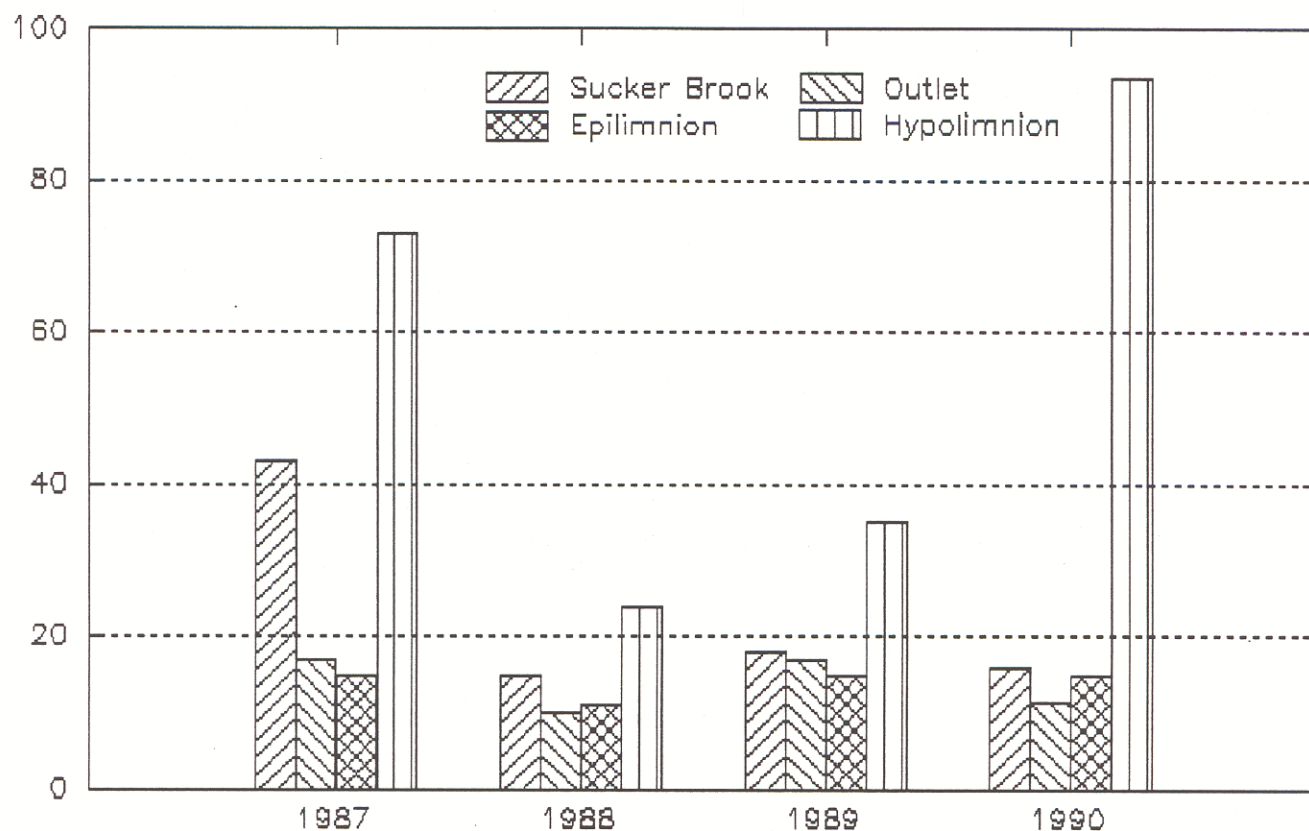


Figure II-2. Epilimnetic, hypolimnetic, tributary and outlet total phosphorus data collected by the Volunteer Lake Assessment Program

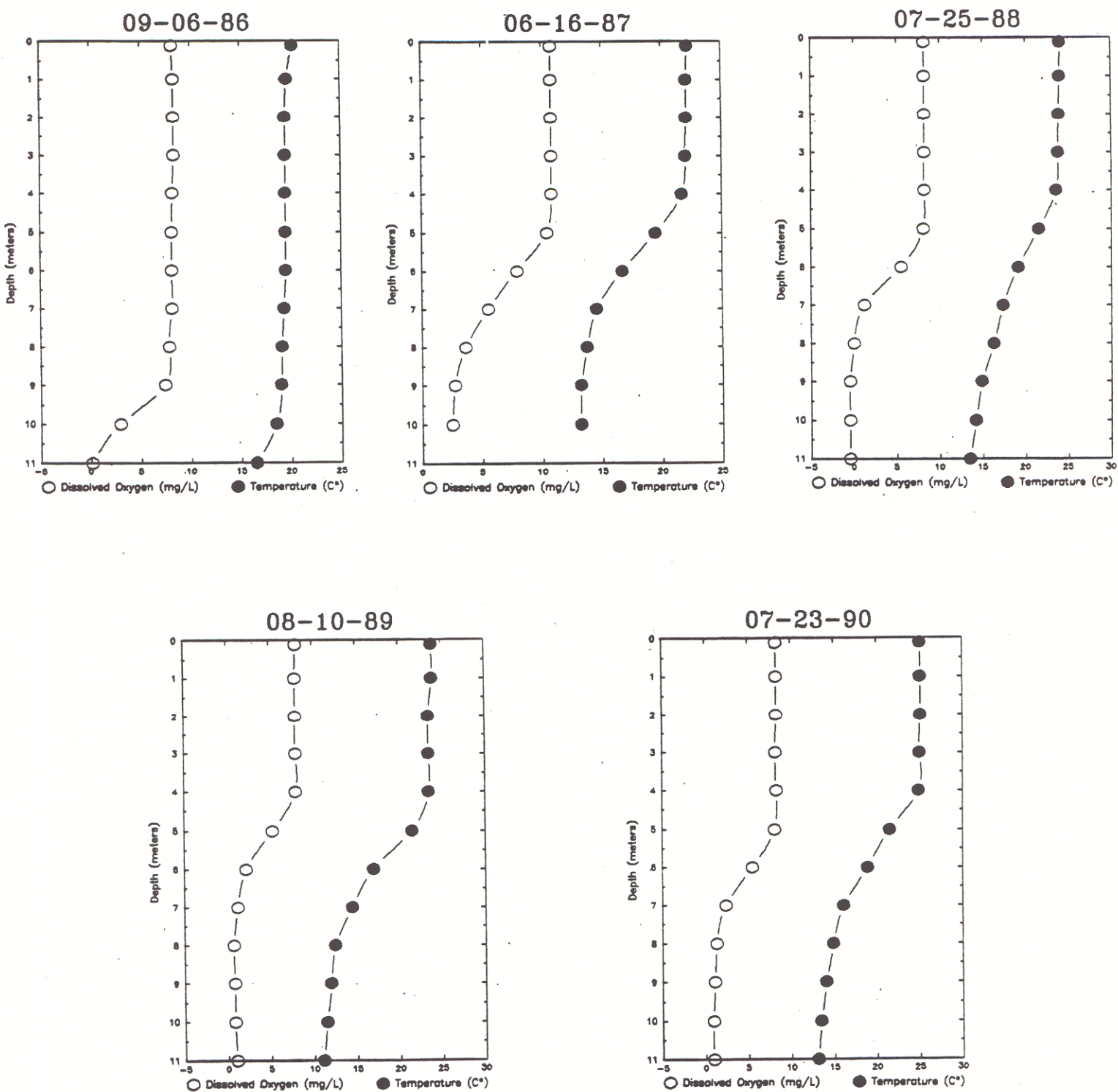


Figure II-3. Dissolved Oxygen/Temperature Profiles collected by the Volunteer Lake Assessment Program.

D. Population Size and Economic Structure

Paper mills and cotton factories were developed in Franklin during the 1820's. These two industries were central to Franklin's history. Even before this time, the Webster Lake outlet was lined with grist, saw and clothing mills and foundaries.

Herrick Aiken and Sons significantly contributed to and influenced the economy of the city. It created new industry for Franklin through its inventions and patents of many ingenious tools and machines including the Aiken knitting machine and needles.

Strikes occurred during the early 1920's at the large International Paper Company. These strikes seriously disrupted business and many factories soon closed down. The 1950's brought more economic misery to the city. In 1953, 275 people were left unemployed with the closing of Sulloway Mills. Acme Knitting Machine and Needles Company closed their doors the same year. The M.T. Stevens & Sons Company mills closed in 1970 eliminating over 300 jobs in Franklin.

A group of local businessmen formed the Franklin Developments Incorporated in 1946. The aim of this group was to lure industries to the floundering city. The first Franklin Developments project began in 1953 with a new building for Hingston Leather on Tannery Street (since closed).

In 1978 Rolfe Camp, president of Franklin Developments Inc. remarked that the city was growing at a gradual rate. He also stated that both industrial and residential growth was at a modest rate which did not put undue strain on municipal services (Shepard).

In the 1980's, economic growth rose steadily allowing many to purchase summer homes or renovate existing structures on Webster Lake. A large subdivision slated for the northeast shore of the lake was proposed. After a long battle between the lake association, city government and the developer, the Bashara development, was not approved. The close of this decade was marked with an increase in the unemployment rate and a tightening of pursestrings throughout the state including public and private industry.

The population of the City of Franklin has remained fairly constant (Table II-1). The 1981 Dufresne-Henry report calculated population projections for those sections of Franklin and Andover that fall within the watershed (Table II-2).

Table II-1.
Historic Year Round Population
Levels for Franklin and Andover

	<u>Franklin</u>	<u>Andover</u>
1960	6742	955
1965	6792	989
1970	7292	1138
1974	7560	1288
1977	7603	1288
1978	7662	1514
1980	7960	1584
1984	7910	1794
1988	8337	1907

Table II-2.
Watershed Population Projections

	<u>1990</u>	<u>1995</u>	<u>2000</u>
Franklin	375	388	401
Andover	<u>525</u>	<u>569</u>	<u>614</u>
Total	900	957	1015
% Increase	6.9%	6.3%	6.1%

Dufresne-Henrey, 1981